# DPS Open House

Commercial Structures /
International Building Code

# Open House Agenda

- Opening Remarks
  - Hadi Mansouri, Division Chief
- Transitioning to the IBC 2009
  - Mike Pokorny, Senior Permitting Specialist
- NEC Changes, Inspection Procedures, Code Lynx
  - Phillip Waclawski and Hemal Mustafa, Managers
- Changes in the 2009 IMC
  - Paul Toschi, Senior Permitting Specialist
- 2009 IECC Provisions and Energy Inspections
  - Mark Nauman, Senior Permitting Specialist

# Transitioning to the 2009 IBC

Selected changes from the 2006 IBC

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# Applicable Codes

- On May 18, 2010, the County Council approved Executive Regulation 26-09 which adopted the 2009 editions of the International Codes
  - IBC, IMC, IFGC, IRC
- On July 19, 2010, DPS will only accept plans designed in accordance with the 2009 International Codes

# Applicable Codes (continued)

- The 2008 National Electrical Code was adopted on March 15, 2010
- Fire Codes (NFPA 1 & 101):
  - State of Maryland adopted the 2009 editions of as of January 1, 2010
  - Montgomery County still enforcing 2003 editions
  - Status of local NFPA adoption…

# Applicable Codes (continued)

- Rehabilitation Projects
- Maryland Building Rehabilitation Code (MBRC)
  - MD pamphlet is not applicable
  - 2006 edition of the International Existing Building Code
  - 2009 edition… Awaiting on action from the MD Rehabilitation Code Advisory Council

# Chapters 1 & 2

- Section 106 – Posting of live loads
  - Previously in Chapter 16

- New Definitions:
  - Ambulatory Health Care Facility
  - Outpatient Clinic
  - Primary Structural Frame
  - High Rise Building

# Chapter 3

- Group I-2
  - "more than 5 persons" deleted from general description
  - Except Child Care Facilities & Nursing Homes
- "Small" Bed and Breakfasts
  - Classified as R-1 but can be built as R-3

# Chapter 4

- Covered Mall Buildings
  - Open Malls
  - Reduced open space around the mall
- Parking Structures
  - Vehicle Barriers – 33 inches tall
- Ambulatory Health Care
  - Sprinkler if >3 persons - or any above LED - incapable of self preservation
- Storm Shelters

# Chapter 4 (continued)

- High Rises
  - High rise & **super high-rise** (420 feet)
  - "Toughened" stair & elevator shafts (1604.5)
  - SFRM Bond Strength
  - **Sprinkler – zone piping & water supply**
  - Smoke removal
  - Remote stair enclosures
  - **Additional exit stair**
  - Luminous egress path lighting
  - Fire Service Access Elevators

# Chapter 5

- Allowable stories reduced for Type IIB & IIIB - Use Group B, M, & S
- Changed up Mixed Uses (again)
- Parking & Storage not listed in "Incidental" Table
- Special Construction
  - Buildings above a horizontal assembly to be separate and distinct

# Chapter 7

- Fire or smoke rated walls, barriers, partitions must be identified in concealed spaces

  FIRE BARRIER/SMOKE BARRIER

  PROTECT ALL OPENINGS

- Requirements for application of SFRM
- Exterior walls within 10 feet of lot line rated from both sides

# Chapter 7 (continued)

- Individual openings in Fire Walls allowed up to 156 sq. ft.
- Separation between Fire Areas
- Shafts that only serve parking garages no longer need enclosure
- Additional details for Elevator Shaft Pressurization

# Chapter 7 (continued)

- Support of certain rated horizontal assemblies in Type IIB, IIIB & VB buildings
- Horizontal Smoke Barriers
  - Elevator Lobbies required
  - No unprotected vertical openings

# Chapter 7 (continued)

- Curtain Wall/Floor Intersections
  - Voids protected for rated AND non-rated floor ceiling assemblies
- Fire door frames with sidelights
  - If greater than ¾ hour fire protection rating needed, fire resistance rated glazing in the sidelight (transom)

# Chapter 9

- Group E – sprinkler trigger at >12,000 square feet (from 20,000)
- Group M – sprinkler trigger if display and sale of upholstered furniture
- Enclosed Parking Garages – sprinkler when greater than 12,000 square feet or located below another group

# Chapter 9 (continued)

- Sprinkler protection under outdoor decks, patios for 13R systems – only if a roof/deck above
- Fire Extinguisher language from IFC brought into the IBC
- Fire Alarm section reorganized
  - Min sound level is 75 dBA in R & I-1use
  - Max sound level is 110 dBA

# Chapter 9 (continued)

- Fire Command Centers
  - Area minimum of 200 square foot
  - 10 foot minimum dimension
- New Section on Fire Pumps
- New Section for Emergency Responder Safety Features
  - Equipment room identification
  - HVAC, Sprinkler, Fire Alarm

# Chapter 10

- New Definitions
  - Level of Exit Discharge
  - Flight
  - Suite
- Egress Widths – every use is 0.3 or 0.2 inches
- Certain door hardware is not included when checking for encroachment

# Chapter 10 (continued)

- Accessible means of egress
  - Two-way communication needed at elevator landings
  - Specific signage requirements
- Manual horizontal sliding doors
  - When occupant load is less than 10
- Electromagnetic Locks

# Chapter 10 (continued)

- Stair access to elevator equipment
- Exit signs within exits if path is not direct
- Guards needed if there is a 30 inch drop within 36 inches

# Chapter 10 (continued)

- Guards 42 inches above fixed seating
  - Measure from the seat board
- Openings in guards above 36 inches reduced to 4.375 inches (from 8)
- Common path of travel in R-2: 125 feet when sprinklered 13 or 13R

# Chapter 10 (continued)

- Single means of egress dwelling units with occupant load up to 20 persons. (if CPT acceptable)
- Dead ends for E, I-1, M, R-1, R-2, R-4, S & U increased to 50 feet when sprinklered
- Single exit stories vs. Single Exit Buildings

# Chapter 10 (continued)

- Luminous Egress Path Marking
  - High Rise: A, B, E, M and R-1
  - Stairs, handrails, obstructions, doors
- Assembly rooms in E occupancies
  - Clarify that requirements for aisles, etc. apply in these rooms
  - Tablet arms – clear width measured when tablets in the use position

# Chapter 14

- Specific requirements for EIFS
  - Special inspections required

# Chapter 16

- Vehicle barrier systems
  - 18 inch bumper
  - 27 inch bumper
- Live Load for Roofs used for Assembly
  - If greater than 100 psf, then irreducible

# Chapter 30

- Elevator Machine Rooms
  - New exception to decrease the rating of the machine room
- Fire Service Elevators
  - High rises > 120 feet
  - Lobbies, Standpipes, Electrical Protection
- Occupant Evacuation Elevators
  - An option for the additional stair in high-rises > 420 feet

# Quiz Time…

# In Montgomery County, on which date will permits be required to use the 2009 I-Codes?

A) May 18, 2010
B) July 19, 2010
C) January 1, 2010
D) January 1, 2011

# What is the minimum height of a vehicle barrier?

A) 18 inches
B) 27 inches
C) 33 inches
D) 36 inches

In Montgomery County, on which date were the 2009 I-Codes adopted by Executive Regulation?

A) May 18, 2010
B) July 19, 2010
C) January 1, 2010
D) January 1, 2011

Which Use Group E fire area is not required to be protected with automatic sprinklers?

A) 9,000 square feet
B) 12,000 square feet
C) 15,000 square feet
D) A & B
E) None of the above

Fire service elevators are required for high rises which are more than _____ in height above fire department access?

A) 75 feet
B) 120 feet
C) 420 feet
D) None of the above.

# Local Amendments

The new, the old, and the …

# Chapter 1

- Final Inspections are required for permits even if the space has a valid Use & Occupancy Certificate

# Chapter 4

- Live/Work Units Section deleted
  - Conflicts with the Zoning Ordinance on Home Occupation
- Modified the new Ambulatory Health Care section regarding refuge area
  - Coordinate requirements with Fire Code
- Radon Control for R occupancies

# Chapter 5

- Changed the size of address numbers to match the requirements of the Fire Code
- Pedestal construction
  - Anything above the 3-hour horizontal plate is a story above grade
  - Fire command center required

# Chapter 7

- Sign or stenciling state the fire resistance rating in hours
- Elevator lobbies
  - Lobbies shall not interrupt an exit access corridor

# Chapter 9

- Assembly occupancies requiring sprinklers
  - Bars with live entertainment
  - Dance Halls
  - Discotheques
  - Nightclubs
  - Assembly occupancies with festival seating

# Chapter 9 (continued)

- New exception for Residential use sprinklers throughout the building
  - One dwelling unit
  - Not otherwise required to be sprinklered
  - Dwelling unit separated and independent
  - Dwelling unit sprinklered

# Chapter 9 (continued)

- Fire Command Center
  - Door to exterior on address side
  - Within 50 feet of the fire department access road
  - Access box within 6 feet
  - Signage
  - Shunt trip device for electrical power

# Chapter 9 (continued)

- Emergency Responder Radio Coverage
  - Below ground floors
  - Floors greater than 25,000 square feet
  - All floors in buildings greater than 3 stories in height

# Chapter 10

- Shell Office Spaces – 65 sf / person
- Stairs of three risers or less - 13 inch treads
- Doors in exit enclosures swing in the direction of egress travel
- Stair geometry within dwelling units not modified

# Chapter 10 (continued)

- Deleted the "fully sprinklered" exceptions for Stairways and Areas of Refuge in Accessible Means of Egress Section
- Thus, most new structures will require:
  - Stairways with 48 inches between handrails
  - Areas of refuge at stairways and elevators

# Chapter 10 (continued)

- Handrail extensions in the same direction of the stair run except where a "hazard" is created
- Handrail clearance from the wall: increased to 2.25 inches
- Guards within dwelling units permitted to be 36 inches high

# Chapter 10 (continued)

- Fire Department Access to Floors
  - One stair serving all floors available from the main entrance/fire department response point
- Interior Exit Discharge Doors
  - Direct sight from the stair discharge door to the exterior door
  - Exit signs not acceptable

# Chapter 14

- Window sills for buildings 4 stories or less in height not less than 18 inches above the finished floor
- Windows within 18 inches either unopenable or have openings to prevent passage of a 4 inch sphere below 18 inches

# Chapter 16

- Fire Truck Loading
  - 85,000 pounds over three axles
  - Two out of four outriggers applying approximately 61,800 pounds each with no load on the remaining outriggers
- Roof Loads – 30 psf non-reducible
- Ground Snow Loads – 30 psf

# Quiz Time…

The fire command center is required to have a door to the interior of the building.

True

False

# The maximum fire truck operating weight in Montgomery County is:

A) 80,000 pounds on two axles
B) 85,000 pounds on two axles
C) 85,000 pounds on three axles
D) 80,000 pounds on two outrigger pads

The Montgomery County amendments to the IBC has modified the stair geometry within dwelling units.

True

False

# Thanks for your attention!

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# ***Regulation # 15-09***

- *This regulation adopts the National Electrical Code, 2008 Edition, with local amendments. This regulation applies to all electrical equipment, installations and activities within the County.*
- *Effective date: March 15, 2010*

# *Section 9 is a new amendment*

- *Added to match the NEC with the requirements of Section 11.1.9 Building Disconnect of NFPA 1 "Uniform Fire Code"*
  - D/X shall be located with access either directly to the outside or in close proximity to an outside door

# *Section 9.*

- *Section 230.70(A)(1). Add the following:*
- *In new buildings, excluding one and two family dwellings, a shunt trip **to disconnect the electrical service** to the building shall be provided a follows:*
- *(a) In the Fire Command Center, where a Fire Command Center is in the building.*
- *(b) At the fire alarm annunciator, where there is no :Fire Command Center.*
- *(c) In an appropriately sized and weatherproof fire department access box on the address side of the building, where there is no fire alarm annunciator or Fire Command Center.*
- *In existing buildings, excluding one and two family dwellings, where there are significant upgrades to the building electrical service, such as modifying or replacing the switchgear, a disconnecting means shall be provided as for new installations.*

**The Codes Administration website contains building, fire and other codes information for the State of Maryland and includes information from those local jurisdictions that adopt and enforce these codes. There are links to related federal government agencies for the accessibility code, the energy code and the HUD Manufactured Home program**

# Maryland Code Lynx

- Web Site is
- Mdcodes.umbc.edu

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# Significant changes to the 2009 International Mechanical Code

# Chapter 3 General Regulations

- Section 312.1 previously required the use of ASHRAE'S Handbook of Fundamentals to calculate building heating and cooling loads. The 2009 IMC now requires the ASHRAE/ ACCA Standard 183 to calculate heating and cooling loads.

# Chapter 4 Ventilation

- Chapter 4 has been completely reorganized.
- The method of calculating ventilation air has changed to reflect ASHRAE 62 2004.
- The new method of calculation has reduced the required ventilation air rates by 50%.
- This change is intended to improve indoor air quality and reduce energy consumption.

# Chapter 5 Exhaust Systems

- The maximum length of cloths dryer exhausts ducts was increased from the 2006 IMC limit of 25’ to 35’ in the 2009 IMC.
- A dryer exhaust duct fitting equivalent length chart was added depicting 4 to 10 inch radius fittings.

# Chapter 6 Duct Systems

- Section 607.5.5.1, “Enclose at the bottom”, was added directing the reader to section 708.11 of the IBC. This will ensure that the bottom of a rated shaft will be properly protected.
- Section 607.5.6, “Exterior walls”, adds the requirement for fire dampers in ducts and air transfer openings that penetrate fire resistance rated exterior walls.

# Chapter 11 Refrigeration

- Section 1101.10, “Locking access port caps”, was added requiring locking access port caps for outdoor refrigeration units to deter and prevent the unauthorized access to the refrigerant within the appliance. The intention was to prevent harm to children from inhalation of refrigerant.

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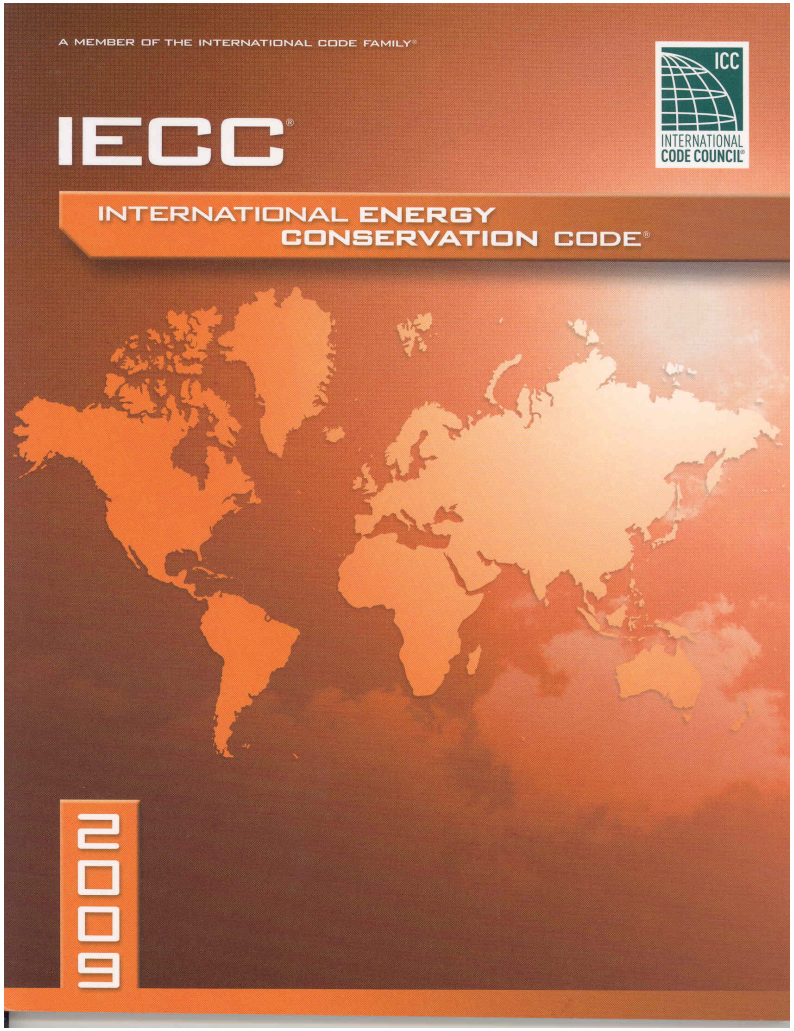
# Commercial Requirements

2009 International Energy Conservation Code (IECC)

Adopted May 18, 2010

All permit applications made after July 18, 2010 shall comply with this code.



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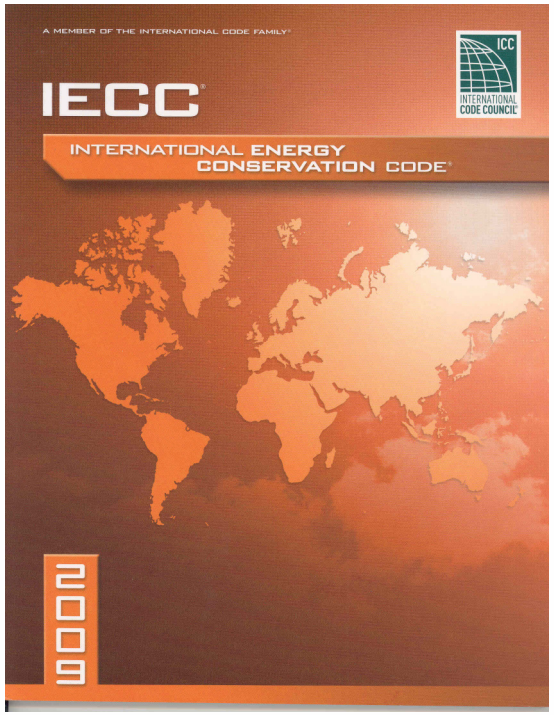
# Structure of the IECC

- Chapter 1 Administrative
- Chapter 2 Definitions
- Chapter 3 Climate Zones
- Chapter 4 Residential Energy Efficiency
- Chapter 5 Commercial Energy Efficiency
- Chapter 6 Referenced Standards

# Code changes 2006-2009

| | 2006 IECC Changes | 2009 IECC Changes |
|---|---|---|
| **Chapter 1 Administration** | | |
| | *Section 101.4 Applicability. (No changes)* | *Section 101.4 Applicability.* New text for the main heading of this section reads:<br><br>"Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern". |
| | *Section 101.4.3 Additions, alterations, renovations or repairs. (No changes)* | *Section 101.4.3 Additions, alterations, renovations or repairs.* This section has undergone significant change and has included several new exceptions, new text reads:<br><br>"Additions. Alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of the code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building. **Exception**: the following need not comply provided the energy use of the building is not increased".<br><br>**1**. Storm windows installed over existing fenestration. **2**. Glass only replacements in an existing sash and frame. **3**. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation. **4**. Construction where the existing roof, wall or floor cavity is not exposed. **5**. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above of below the sheathing. **6**. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separate a conditioned space from the exterior shall not be removed. **7**. Alterations that replace less than 50% of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power. |

# Major Changes to the Envelope Requirements




- Commercial Provisions Contained in Chapter 5
  - IECC
  - ASHRAE 90.1-2007
- Tables 502.2(1) and Table 502.2(2) Building Envelope Requirements – Opaque Assemblies

# Changes to Tables 502.1.2 and 502.2(1)

- Table now separated by occupancy type
  - Group R occupancies use “Group R” column
  - Non-Group R occupancies use “All other” column

TABLE 502.1.2
BUILDING ENVELOPE REQUIREMENTS OPAQUE ELEMENT, MAXIMUM *U*-FACTORS

| CLIMATE ZONE | 1 | | 2 | | 3 | | 4 EXCEPT MARINE | | 5 AND MARINE 4 | | 6 | | 7 | | 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R |
| Roofs | | | | | | | | | | | | | | | | |
| Insulation entirely above deck | U-0.063 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.048 | U-0.039 | U-0.039 | U-0.039 | U-0.039 |
| Metal buildings | U-0.065 | U-0.065 | U-0.055 | U-0.055 | U-0.055 | U-0.055 | U-0.055 | U-0.055 | U-0.055 | U-0.055 | U-0.049 | U-0.049 | U-0.049 | U-0.049 | U-0.035 | U-0.035 |
| Attic and other | U-0.034 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 | U-0.027 |
| Walls, Above Grade | | | | | | | | | | | | | | | | |
| Mass | U-0.058 | U-0.151 | U-0.151 | U-0.123 | U-0.123 | U-0.104 | U-0.104 | U-0.090 | U-0.90 | U-0.80 | U-0.080 | U-0.071 | U-0.071 | U-0.071 | U-0.071 | U-0.052 |
| Metal building | U-0.093 | U-0.093 | U-0.093 | U-0.093 | U-0.084 | U-0.084 | U-0.084 | U-0.084 | U-0.069 | U-0.069 | U-0.069 | U-0.069 | U-0.057 | U-0.057 | U-0.057 | U-0.057 |
| Metal framed | U-0.124 | U-0.124 | U-0.124 | U-0.064 | U-0.084 | U-0.064 | U-0.064 | U-0.064 | U-0.064 | U-0.064 | U-0.064 | U-0.057 | U-0.064 | U-0.052 | U-0.064 | U-0.037 |
| Wood framed and other | U-0.089 | U-0.089 | U-0.089 | U-0.089 | U-0.089 | U-0.089 | U-0.089 | U-0.064 | U-0.064 | U-0.051 | U-0.051 | U-0.051 | U-0.051 | U-0.051 | U-0.036 | U-0.036 |

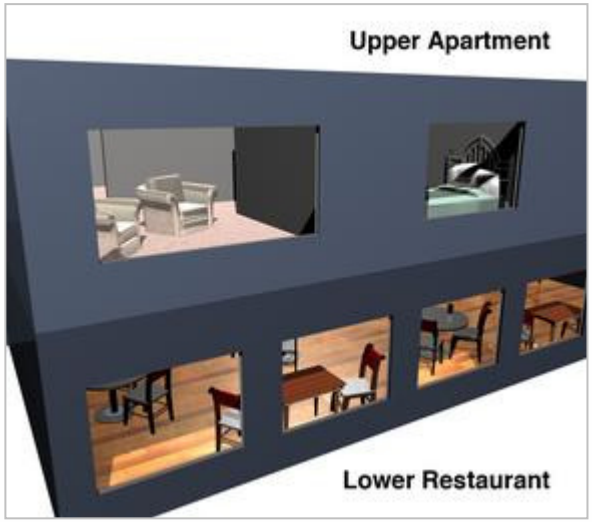
# Does My Project Need to Comply with the Commercial Provisions in the IECC?

All Buildings Other Than:

- One- and two-family residential
- R-2, R-3, R-4 three stories or less in height

# Mixed Use Buildings

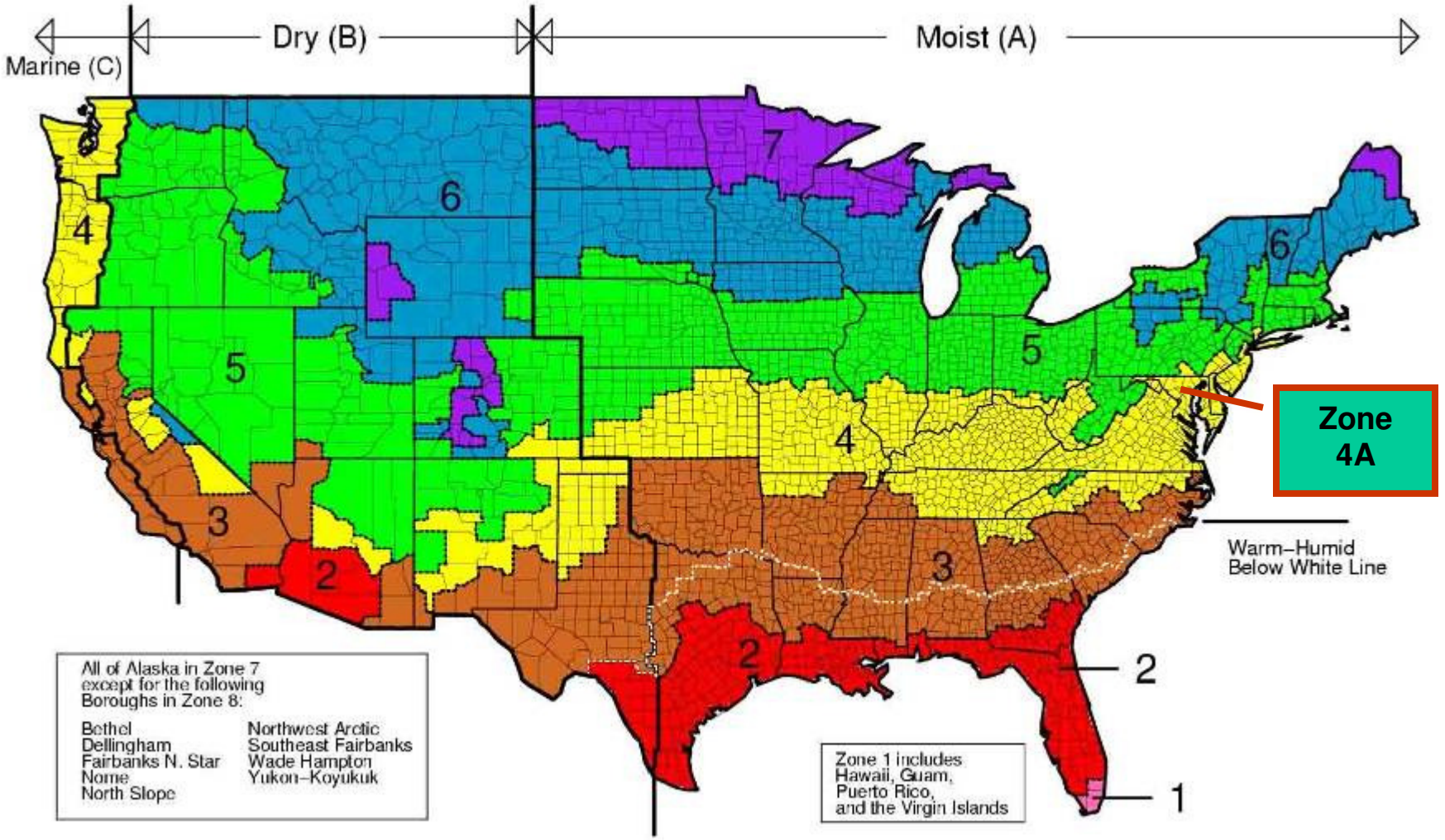
- Mixed occupancies (under four stories)
  - Treat the residential occupancy under the applicable residential code
  - Treat the commercial occupancy under the commercial code

# What are My Options for Complying with the IECC?


- Chapter 5 of the IECC General Prescriptive Approach
  - Use for ≤ 40% of gross wall area in vertical fenestration
  - Use for ≤ 3% of gross roof area in skylights
- Section 506 Total Building Performance Approach
- ASHRAE/IESNA Standard 90.1-2007
  - Section 501.2 “Application” requires 90.1 to be used in its entirety (Envelope, Lighting, Mechanical) if used as an alternate compliance path

# Climate Zones—2009 IECC




Determining Your Climate Zone is the First Step in the Process

# Mandatory Requirements – Sealing of the Building Envelope *(502.4.3)*

- All penetrations, openings, joints and seams in the building envelope must be sealed. Materials that can be used include:
  - Caulking
  - Gasketing
  - Tapes
  - Moisture vapor-permeable wrapping material
- Sealing materials spanning joints between dissimilar materials must allow for expansion and contraction

# Air Leakage Control

Mandatory Requirements

- Building envelope
  - Sealed with caulking materials or
  - Closed with gasketing systems
  - Joints and seams sealed or taped or covered with a moisture vapor-permeable wrapping material

# Mandatory Requirements – Recessed Lighting *(502.4.8)*

All recessed luminaires installed in the building envelope

- Type IC rated and sealed with gasket or caulk between housing and interior wall or ceiling covering
- Type IC rated and labeled in accordance with ASTM E 283 to allow ≤ 2.0 cfm of air movement from conditioned space to ceiling cavity

# Mandatory Requirements – Outdoor Air Intakes and Exhaust Openings *(502.4.5)*

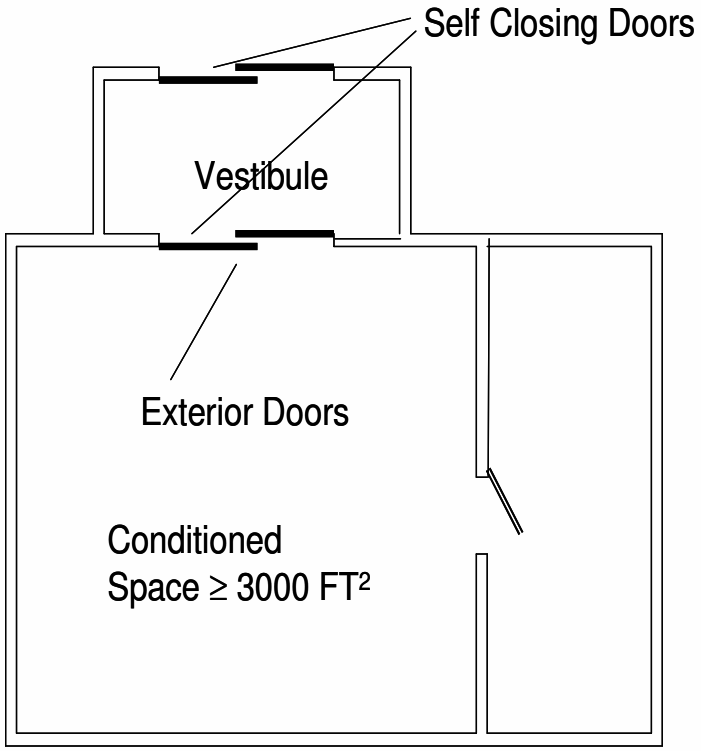
- Buildings ≥ 3 stories in height above grade
  - Class 1 motorized leakage-rated damper
    - Maximum leakage rate ≤ 4cfm /ft$^2$ @ 1.0 inch w.g.
- Buildings < 3 stories in height
  - Gravity (nonmotorized) allowed

# Mandatory Requirements – Loading Dock Weatherseals *(502.4.6)*

- Equip cargo doors and loading dock doors with weatherseals
- Goal is to restrict infiltration

# Mandatory Requirements – Vestibules *(502.4.7)*

- Required to reduce infiltration into spaces
- Required on entrance doors leading into spaces ≥ 3,000 ft²
- Doors must have self-closing devices
- Exceptions
  - Buildings in Climate Zones 1 and 2
  - Doors from a guest room or dwelling unit
  - Doors used primarily for vehicular movement, material handling and adjacent personnel doors



# Commercial Mechanical Requirements

Section 503

Building Mechanical Systems

# Section 503 Building Mechanical Systems

Simplified to Include Only Four Sections:

- What Provisions of the Code Apply (503.1)
- Mandatory Provisions (503.2)
- Simple HVAC Systems and Equipment (503.3)
- Complex HVAC Systems and Equipment (503.4)

# Mandatory Provisions *(503.2)*

## Provisions Applicable to ALL Mechanical Systems

- HVAC Load Calculations
- Equipment and System Sizing
- HVAC Equipment Performance Requirements
- HVAC System Controls
- Ventilation
- Energy Recovery Ventilation Systems
- Duct and Plenum Insulation and Sealing
- Piping Insulation
- HVAC System Completion
- Air System Design and Control
- Motor Nameplate Horsepower
- Heating Outside a Building

# Simple HVAC Systems and Equipment *(503.3)*

Unitary or packaged, single zone controlled by a single thermostat in the zone served. Includes:

**Simple Systems**

- Unitary packaged cooling system
- Split system cooling
- Packaged terminal A/C
- Heat pump cooling
- Unitary packaged heating
- Split system heating
- Packaged terminal heat pump
- Fuel-fired furnace
- Electrical resistance heating
- Two-pipe heating systems w/o cooling
- Economizers

# Complex HVAC Systems and Equipment *(503.4)*

**Complex Systems**

- Packaged VAV reheat
- Built-up VAV reheat
- Built-up single-fan, dual-duct VAV
- Built-up or packaged dual-fan, dual-duct VAV
- Four-pipe fan coil system with central plant
- Hydronic heat pump with central plant
- Any other multiple-zone system
- Hydronic space heating system
- Economizers

This section applies to all HVAC equipment and systems not included in Section 503.3

# HVAC Load Calculations *(503.2.1)*

Heating and cooling load sizing calculations required

- ASHRAE/ACCA Standard 183
- Other approved computation procedures – defined in Chapter 3
  - Exterior design conditions
    - Specified by ASHRAE
  - Interior design conditions
    - Specified by Section 302 of the IECC
      - ≤ 72°F for heating load
      - ≥ 75°F for cooling load

# HVAC Performance (Minimum Efficiency) Requirements *(503.2.3)*

- Applies to all equipment used in heating and cooling of buildings
- Must comply with all listed efficiencies
- Exception
  - Water-cooled centrifugal water-chilling packages

# HVAC System Completion *(503.2.9)*

- Air System Balancing
- Hydronic System Balancing
- Manuals
  - Equipment Capacity and Required Maintenance
  - Equipment O & M Manuals
  - HVAC System Control Maintenance and Calibration Information
  - Written Narrative of Each System Operation

# Service Water Heating

Section 504

(Mandatory)

# Pool Requirements *(504.7)*

- Pool heaters *(504.7.1)*
  - Readily accessible on-off switch
  - Natural gas or LPG fired pool heaters will not have continuously burning pilot lights
- Time switches *(504.7.2)*
  - Automatic controls required to operate pool heaters and pumps on a preset schedule
  - Exceptions
    - Where public health standards require 24 hour operation
    - Where pumps are required to operate solar and waste heat recovery pool heating systems

# Pool Covers *(504.7.3)*

- Heated pools required to have a pool cover
  - Pool cover must be vapor retardant
- Pools heated to over 90°F
  - Minimum R-12 insulation
- Exception
  - Pools deriving > 60% energy for heating from site-recovered energy or solar source

# Commercial Lighting Requirements

Section 505

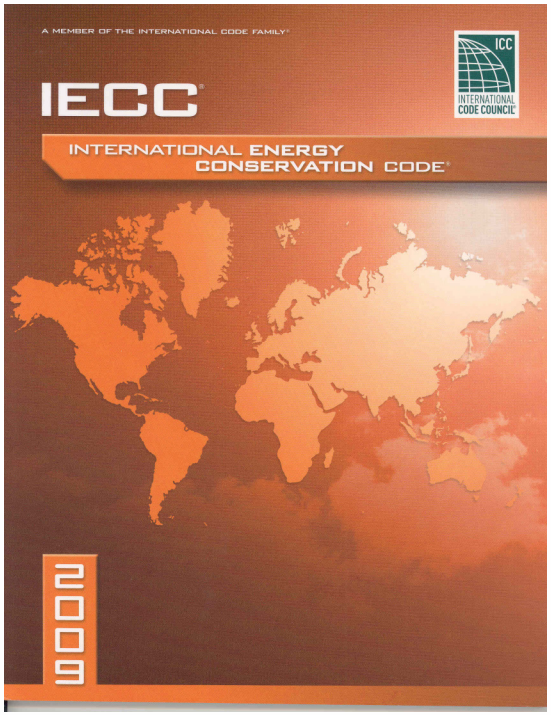
Electrical Power and Lighting Systems

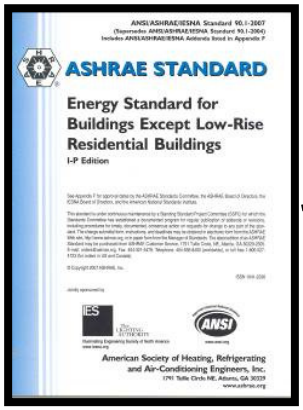
(Mandatory)

# Commercial Lighting Requirements in 2009 IECC

- Commercial provisions contained in Chapter 5…with reference to ASHRAE 90.1-2007
- Covers lighting controls and power density for interior and exterior

  Exception: Lighting within dwelling units
- Major changes in the 2009 version
  - Daylight zone control
  - New exterior lighting zones



# When do the Lighting and Power Requirements Apply?

- Original Installed Lighting System in a New Building, Addition, or Tenant Build-out
- Existing Lighting System that is Altered
- Change in Occupancy that Increases Energy

Exceptions:

- Historic buildings
  - State or National listing
  - Eligible to be listed
- Alterations where less than 50% of the luminaires are replaced and power is not increased
- Lighting within dwelling units
  - Where ≥ 50% of permanently installed fixtures are high-efficacy lamps

# What's Covered Under Electrical Power and Lighting Systems Requirements?

- Mandatory Interior Lighting requirements
  - Required Controls
  - Wattage/Efficiency Limits
- Interior Lighting Power Allowances (watts/ft$^2$)
- Exterior Lighting Controls
  - Required Controls
  - Lamp Efficiency
- Exterior Lighting Power Allowances (watts/ft$^2$)
- Electric Metering

# What if My Proposed Design Does Not Meet Code?

- Check calculations and design
  - Appropriate area type allowances used?
  - Actual lighting equipment wattages used?

  …and design
  - Reasonable illuminance levels provided?
  - Efficient light sources used?
- Use alternate Standard 90.1-2007*
- Use total Building Performance Method

*Section 501.2 Application requires 90.1 to be used in its entirety (Envelope, Lighting, Mechanical) if used as an alternate compliance path

# Electrical Energy Consumption Mandatory Requirement *(505.7)*

- Separate metering required for each dwelling unit

Intent: Occupant understanding of actual energy use can promote effective energy use!

# Total Building Performance

Section 506

Compliance Option

# Total Building Compliance Option

SECTION 506
TOTAL BUILDING PERFORMANCE

**506.1 Scope.** This section establishes criteria for compliance using total building performance. The following systems and loads shall be included in determining the total building performance: heating systems, cooling systems, service water heating, fan systems, lighting power, receptacle loads and process loads.

**506.2 Mandatory requirements.** Compliance with this section requires that the criteria of Sections 502.4, 503.2, 504 and 505 be met.

**506.3 Performance-based compliance.** Compliance based on total building performance requires that a proposed building (*proposed design*) be shown to have an annual energy cost that is less than or equal to the annual energy cost of the *standard reference design*. Energy prices shall be taken from a source *approved* by the *code official*, such as the Department of Energy, Energy Information Administration's *State Energy Price and Expenditure Report*. *Code officials* shall be permitted to require time-of-use pricing in energy cost calculations. Nondepletable energy collected off site shall be treated and priced the same as purchased energy. Energy from nondepletable energy sources collected on site shall be omitted from the annual energy cost of the *proposed design*.

**Exception:** Jurisdictions that require site energy (1 kWh = 3413 Btu) rather than energy cost as the metric of comparison.

**506.4 Documentation.** Documentation verifying that the methods and accuracy of compliance software tools conform to the provisions of this section shall be provided to the *code official*.

# Total Building Performance Option (Cont.)

**506.4.1 Compliance report.** Compliance software tools shall generate a report that documents that the *proposed design* has annual energy costs less than or equal to the annual energy costs of the *standard reference design*. The compliance documentation shall include the following information:

1. Address of the building;
2. An inspection checklist documenting the building component characteristics of the *proposed design* as *listed* in Table 506.5.1(1). The inspection checklist shall show the estimated annual energy cost for both the *standard reference design* and the *proposed design*;
3. Name of individual completing the compliance report; and
4. Name and version of the compliance software tool.

**506.4.2 Additional documentation.** The *code official* shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the *standard reference design*;
2. Thermal zoning diagrams consisting of floor plans showing the thermal zoning scheme for *standard reference design* and *proposed design*.
3. Input and output report(s) from the energy analysis simulation program containing the complete input and output files, as applicable. The output file shall include energy use totals and energy use by energy source and end-use served, total hours that space conditioning loads are not met and any errors or warning messages generated by the simulation tool as applicable;
4. An explanation of any error or warning messages appearing in the simulation tool output; and
5. A certification signed by the builder providing the building component characteristics of the *proposed design* as given in Table 506.5.1(1).

**506.5 Calculation procedure.** Except as specified by this section, the *standard reference design* and *proposed design* shall be configured and analyzed using identical methods and techniques.

**506.5.1 Building specifications.** The *standard reference design* and *proposed design* shall be configured and analyzed as specified by Table 506.5.1(1). Table 506.5.1(1) shall include by reference all notes contained in Table 502.2(1).

# Inspections

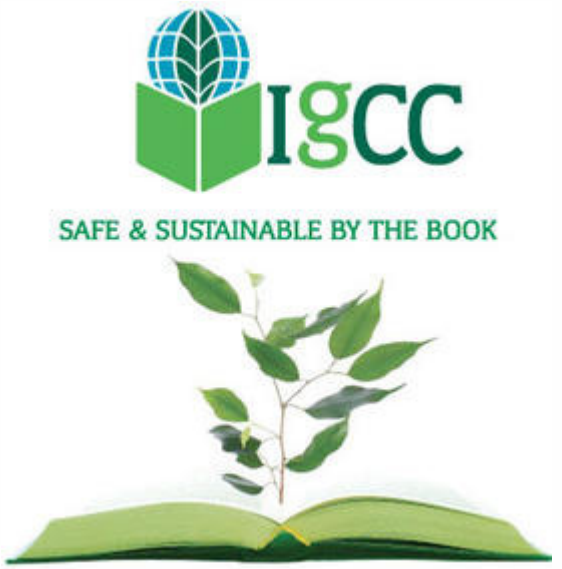
*(In addition to IBC requirements)*

**Commercial Inspection Checklist**

| Requirement | Verify | Reference |
|---|---|---|
| Slab edge insulation R-value and depth | R-value and depth and installation | [502.2.6 and Table 502.2(1)] Approved plans (On-site) |
| Basement/Below-grade wall insulation | R-value and installation | (502.2.4) Approved plans (On-site) |
| Crawl space/Under-floor insulation | R-value and installation | (502.2.5) Approved plans (On-site) |
| Duct sealing and insulation if appropriate | Joint sealing and R-value | (503.2.7-502.7.1.3) Approved plans (On-site) |
| | **Framing Inspection** | |
| Air leakage building envelope | Visual Inspection | 502.4.3 |
| Ductwork sealing and insulation | Verify by pressure test or visual inspection | (503.2.7-502.7.1.3) Third party or visual |
| Fenestration air-leakage | By label | To standards (502.4.1-502.4.2) |
| Fenestration and skylight areas | Area of windows and skylights | Approved plans |
| Fenestration and skylight U-factors | By label | Approved plans and certificate |
| | **Insulation Inspection** | |
| Wall insulation properly installed | By wall construction type/visual inspection | 502.2.2-502.2.4 Approved plans and certificate |
| Ceilings or roof insulation | Visual inspection | Table 502.2(1) Approved plans and certificate |
| Vapor barrier | Visual inspection | 402.2.9 Crawlspace |
| Duct sealing and insulation | Visual joint sealing and R-value | IECC/IRC and Certificate (On-site) |
| Access hatches and doors | Visual/R-value and sealing | 402.2.3 |
| | **Final Inspection** | |
| HVAC system controls | 1 thermostat per system, programmable if forced air | 403.1.1 |
| Ducts insulation, sealing and tightness | Pressure test when outside thermal envelope | 403.2 Third party or visual |
| Building envelope tightness | Blower door test or 402.4.2 verified | Third party or 402.4.2 |
| Recessed lighting | IC rated and sealed (unless in conditioned space) | 402.4.2 |
| Lighting | 50%/high efficacy, list from electrician/installer | 404 or 405 Prescriptive or design |
| Fireplaces | Visual, gasketed and outdoor air | 402.4.3 |
| Mechanical system piping (insulation) | Visual inspection of insulation | 403.3 |
| Circulating hot water (insulation/switching) | Visual inspection of insulation and switching | 403.4 |
| Mechanical ventilation (dampers) | Visual inspection | 403.5 |
| Equipment efficiency | Visual verification | On-site certificate, approved plans |
| Snow melt systems (if applicable) | Visual inspection | 403.8 |
| Heated pools (covers, heaters and switches) | Visual inspection/verification | 403.9 |
| Maintenance info | Make certain maintenance documents on site | 303.3 |

# The future?...

2012 International Green Construction Code




Available for public view iccsafe.org

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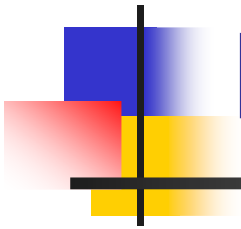

# DPS Open House

Thank you for participation!